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PRINTING PAPER COATED WITH PIGMENT AND ITS PRODUCTION

MITSUBISHI PAPER MILLS LTD

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Abstract:

PURPOSE: To produce the subject coated paper excellent in gloss and smoothness, having a uniform coated layer and free from a coating defect by applying a coating liquid containing a specified amount of a specified delaminated clay by using a curtain coater.

CONSTITUTION: A coating liquid containing delaminated clay composed of 80-100wt.% particle having •1mm particle size in an amount of •3 pts.wt. based on 100 pts.wt. whole pigment is prepared and charged into a storage tank 12 The coating liquid is supplied through a variable flow rate type non- pulse constant delivery pump 13 to a coater head 1 to form a perpendicular curtain film 4 having a uniform distribution of pressure in the cross direction. Coating is carried out by using a curtain coater which is used for bringing the formed perpendicular curtain into contact with a continuously running web 5 and applying it to the web, thus affording the objective coated paper. In addition, the coating liquid flowing down beyond the width of the web 5 is recovered into a receiving tank, returned to a coating liquid-storage tank 12 and recycled.

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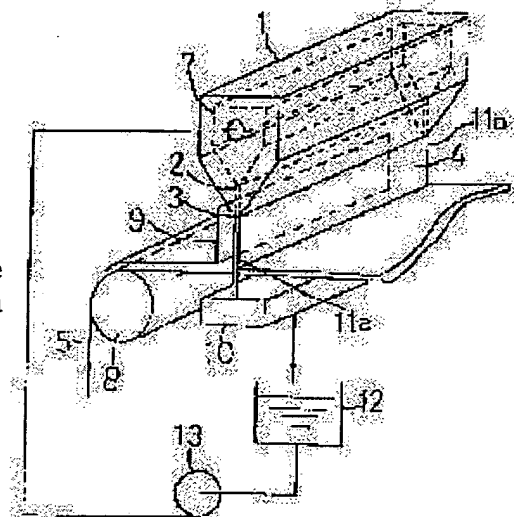
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B05D 7/00(21)Application number : **03-298229** (71)Applicant : **MITSUBISHI PAPER MILLS LTD**(22)Date of filing : **18.10.1991** (72)Inventor : **ARAI TAKAO**
IGARASHI KOJI**(54) PRINTING PAPER COATED WITH PIGMENT AND ITS PRODUCTION****(57)Abstract:**

PURPOSE: To produce the subject coated paper excellent in gloss and smoothness, having a uniform coated layer and free from a coating defect by applying a coating liquid containing a specified amount of a specified delaminated clay by using a curtain coater.

CONSTITUTION: A coating liquid containing delaminated clay composed of 80-100wt.% particle having $\cdot 1\text{mm}$ particle size in an amount of $\cdot 3$ pts.wt. based on 100 pts.wt. whole pigment is prepared and charged into a storage tank 12. The coating liquid is supplied through a variable flow rate type non-pulse constant delivery pump 13 to a coater head 1 to form a perpendicular curtain film 4 having a uniform distribution of pressure in the cross direction. Coating is carried out by using a curtain coater which is used for bringing the formed perpendicular curtain into contact with a continuously running web 5 and applying it to the web, thus affording the objective coated paper. In addition, the coating liquid flowing down beyond the width of the web 5 is recovered into a receiving tank, returned to a coating liquid-storage tank 12 and recycled.

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CLAIMS

[Claim(s)]

[Claim 1] Pigment coated paper for printing which has this application layer that the application liquid of this application layer contains delamination clay more than 3 weight section among the total amount 100 weight sections of this pigment, and 80 - 100% of the weight of this clay is the grain of 1 micrometers or more of particle diameters in the pigment coated paper for printing which comes to prepare the application layer which makes a pigment a principal component, and comes to apply this by the curtain coater.

[Claim 2] The manufacture technique of the pigment coated paper for printing characterized by containing delamination clay more than 3 weight section among the total amount 100 weight sections of this pigment, preparing this application liquid with which 80 - 100% of the weight of this clay consists of the grain of 1 micrometers or more of particle diameters in the manufacture technique of the pigment coated paper for printing which comes to apply the application liquid which makes a pigment a principal component on a base material, and applying this application liquid on this base material using a curtain coater.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the pigment coated paper for printing which applied the application liquid containing a pigment to the band-like base material (a "web" is called hereafter) which carries out a continuity run, and its manufacture technique about the pigment coated paper for printing, and its manufacture technique. Especially, it is related with a print sheet and its manufacture technique, such as an art and a coat paper.

[0002]

[Description of the Prior Art] From the former, as compared with non-applied paper of fine quality, pigment coated paper has smooth nature and high gloss, and since the absorptivity of ink is uniform, it is used as a print sheet. Especially visualization of recent years and printed matter progresses, the demand to a print sheet is also diversified, further, a printing method is also crossed to varieties, such as gravure, rotary offset, and sheet offset, and the development of a print sheet with the property which suited each printing method is progressing. The demand to the application technique of the print sheet which performs a pigment application in such status is excellent in gloss, its surface smooth nature is high, and it is obtaining the product without an application fault under a high productivity.

[0003] Although it goes also over the method of application of the print sheet which performs a pigment application variably, specifically, the blade applying method, the air knife applying method, and the roll applying method can be mentioned. however -- if the quality of an application product and the stability of a process are taken into consideration for the modality and configuration of a pigment which are included in application liquid in these application methods -- not restraining -- it does not obtain, but is obliged to give up the addition of a pigment which has a great effect in the enhancement in a quality, and is in the status which cannot desire to obtain a quality print sheet

[0004] That is, by the blade applying method, it is easy to produce application defects, such as a streak and a scratch, in application operation. In the case of the application liquid which blended the delamination clay which has a ***** configuration especially, this inclination is remarkable. When liquid is drawn in the narrow clearance directly under a blade nose of cam, the orientation of clay does not happen, but the viscosity of liquid becomes high, and a streak and a scratch generate this.

[0005] Thus, if a streak and a scratch occur, since all occurrence fractions serve as a maculature, they will be the increase in efficiency of a production, and the field of a cost, and will serve as a big loss. Moreover, occurrence of these defects will become much more remarkable so that [so that an application speed is accelerated, and] application concentration becomes high, and the increase in efficiency of a production and the enhancement in a quality are incompatible.

[0006] Moreover, in order that the water or the binder component in application liquid may infiltrate into a web beyond at the need in between from supply of surplus applying method [such] liquid to measurement, the liquid which failed to be scratched as a part for a surplus differs from composition of the liquid before supply. Therefore, with the passage of time, composition of application liquid cannot change and cannot obtain the product of the stable quality.

[0007] The air knife applying method tends to generate a pattern peculiar to an air knife in an application layer. By this, the gloss of the front face of an application layer and smoothness fall remarkably, and a quality not only deteriorates, but they serve as a serious failure also at the time of printing. This inclination will become remarkable when the case where an application speed is made high, and liquid are high-concentration-ized, and the increase in efficiency of a production and the enhancement in a quality are incompatible.

[0008] The roll applying method is a method of application which ****s liquid by imprint of the application liquid during a roll combining two or more rolls, and is fundamentally imprinted to a web, although the thing of various formats exists with the combination of a roll etc. A quality not only deteriorates, but it is easy to generate a pattern peculiar to a roll, and the gloss of an application side and smooth nature fall in the case of the sublation after an imprint of an application roll side and a web, and such a method of application serves as a serious failure also at the time of printing. This inclination will become remarkable if liquid concentration or an application speed is made high.

[0009]

[Problem(s) to be Solved by the Invention] The purpose of this invention is realizing the quality manufacture of a product by blending an air knife application method, a blade application method, a roll application method, and the delamination clay that is the special pigment which cannot be realized then into application liquid by using a curtain application method, and obtaining the quality pigment coated paper for printing.

[0010]

[Means for Solving the Problem] In the pigment coated paper for printing which comes to prepare the application layer to which this invention makes a pigment a principal component, and its manufacture technique The application liquid of this application layer is 3 weight section (the weight section points out the addition weight section at the time of making a grand total of a pigment into 100 weight section hereafter.) about the inside of the total amount 100 weight section of this pigment, and delamination clay. By containing above, and 80 - 100% of the weight of this clay's being grain 1 micrometers or more, and applying this application liquid using a curtain coater Occurrence of the streak which occurs frequently by a rod application or blade application is lost, gloss is high, and it finds out that the application side of a smooth and uniform coverage is acquired.

[0011] As the characteristic feature of a curtain application method is known also from the drawing 1 or the drawing 2, the place where liquid has passage regulated at and flows is only the fraction of a slit 2. Although the selection domain of the width of face of this slit is wide, it is usually for 0.2mm - 1mm. In order to form the free surface until the liquid which flowed out of the lip 3 contacts a web 5, it does not have passage regulated in a curtain application. On the other hand, the minimum clearance of a rod, the rod with which measurement of liquid is performed in a blade application method or a blade, and a web is usually 0.05mm or less. Therefore, when an aggregate, a foreign matter, etc. exist in liquid, the curtain application method of the probability which appears as a streak is very lower than a rod or a blade application method.

[0012] Since a curtain application method is a pre-measurement type application method, it has few amounts for which the liquid which flowed out of the head is collected and used. There is much volume collected on the other hand since it is the post-measurement type application method which ****s by failing to scratch once a rod and a blade application method supply liquid to a web superfluously as compared with a curtain application. Moreover, in a rod or a blade application method, when superfluous liquid is supplied to a web, water and the binder in liquid absorb alternatively, recovery liquid high-concentration-izes, application liquid high-concentration-izes or it causes [the foreign matter adhering to the stencil paper front face accompanies to recovery liquid, and] a streak. On the other hand, the stable application can be performed in a curtain application method, without application liquid carrying out concentration change also of the prolonged operation.

[0013] A curtain application method is a pre-measurement type coater, as mentioned above, and since there is no scratch dropping application liquid at the time of an application, it forms the so-called, very

uniform profile application layer which application liquid met in the shape of [of a web] surface type. When applying on the web which was excellent in smooth nature especially, the ideal pigment coated paper for printing excellent in the smooth nature of an application side and the homogeneity of a coverage can be obtained.

[0014] In the concavity of a web, a coverage is insufficient and a coverage is insufficient by the heights superfluously, and by printing after platemaking, it becomes printing unevenness and appears [as opposed to / the irregularity of a web / on the other hand / in a rod or a blade application method]. Moreover, it is difficult for an application side to tend to be in disorder by the roll applying method, in case a roll and an application side exfoliate, and to obtain a uniform coverage fundamentally, and surface smooth nature is also bad. This inclination becomes remarkable by the case where the solid-content concentration of application liquid is high, or the case where viscosity is high, and it becomes difficult to acquire a uniform application side increasingly. If a uniform application side is not acquired, printing unevenness will occur.

[0015] Although this invention is characterized by obtaining the quality pigment coated paper which is not obtained by high productive-efficiency-ization by using a curtain coater by the coater used for an application of the conventional pigment coated paper for printing Furthermore, by using the application liquid which blended delamination clay, as a result of repeating a study The printability of pigment coated paper improved and the rate blended with the particle diameter and application liquid of a pigment of delamination clay became clear [doing the serious influence for the printability of pigment coated paper] further.

[0016] Here, with delamination clay, the mechanical force is applied to the kaolin clay (kaolinite) produced naturally, interlaminar-peeling trituration is performed, and the ***** tabular configuration is made as a configuration. A kaolinite is a 2 octahedron type 1:1 stratified silicic-acid salt, ideally, although chemical composition of 1:1 layers is $\text{aluminum}_2\text{Si}_2\text{O}_5$ and 4, as an octahedron cation, it replaces aluminum and some Fe^{3+} contains it in many cases. Therefore, generally, although a kaolinite shows tabular, if the force more nearly physical than the exterior is applied, the sublation between layers will happen and a still ***** kaolinite will be obtained. Since this trituration technique aims at layer sublation, generally it is called delamination trituration and calls delamination clay the kaolinite obtained by this operation.

[0017] That is, since the configuration is *****, if delamination clay is the same coverage, orientation of it will be carried out on the surface of a web, and its covering will improve. However, at the present which application operation accelerated, in the post-measurement type application method like a blade application method and an air knife application method, since a high shear rate is given to an application layer at the time of measurement, orientation seldom happens. Moreover, in a roll application method, a disturbance of an application side happens at the time of sublation of the application layer after an imprint of application liquid and a roll, and, similarly orientation seldom happens.

[0018] On the other hand, in a curtain application method, the shear rate at the time of measurement is small, and, as for a disturbance of liquid, it does not happen at the time of an application, either. Therefore, it goes on smoothly and the effect of the covering of a pigment becomes high, and the orientation of a pigment has high gloss and can obtain the application layer excellent in the printability.

[0019] If the rate of a particle diameter of parvus grain increases about the particle diameter of a pigment, the inclination of a thixotropy becomes large, it will be hard coming to form a curtain layer, and an elastic aggregate will be formed, and it will become easy to generate lock out inside the slit of a coating-machine head. Furthermore, since the effect of the orientation of grain is not expectable, gloss falls.

[0020] It came to find out that it can carry out, without stabilizing the curtain layer formed with the liquid which makes a pigment a principal component by using the delamination clay with which a particle diameter contains grain 1 micrometers or more 80 to 100% of the weight in the large flow rate

domain, and having the gloss excellent in the application layer in this invention as a result of inquiring zealously, and an application also starting an application fault uniformly. Here, the particle diameter measured by the optical sedimentation method.

[0021] Furthermore, in this invention, by blending this delamination clay more than 3 weight section, the gloss of pigment coated paper improved and it became clear that a printability improves remarkably.

[0022] Therefore, the delamination clay with which a particle diameter contains grain 1 micrometers or more 80 to 100% of the weight is blended with application liquid more than 3 weight section, and it came to find out that the uniform application layer excellent in gloss can be obtained, without an application fault also starting by applying to a web using a curtain coater.

[0023] Although characterized by applying the pigment application layer which contacts a web like the above with a curtain application method in this invention When application liquid applies this application liquid to an application of the pigment coated paper for printing using a curtain coater, including the delamination clay with which a particle diameter contains grain 1 micrometers or more 80 to 100% of the weight more than 3 weight section There is no occurrence of an application fault, stable application operation which applies although application operation attains to a long time, and unevenness etc. does not generate can be performed, a coverage is uniform and what indicated the technique of obtaining gloss and the high pigment coated paper for printing of smooth nature is not yet found.

[0024] Hereafter, based on an accompanying drawing, the embodiment of this invention is explained in detail. Drawing 1 is a schematic diagram of the coater for the pigment coated paper application for printing which showed the embodiment of this invention. From the application liquid storage tank 12, the application liquid prepared beforehand is sent to the coating-machine head 1 with the liquid supply pump 13. In this case, since the amount of liquid sending of application liquid is in the coverage and proportionality of a final product, it is necessary to perform the amount control of liquid sending of the application liquid to the coating-machine head 1 with a sufficient precision. So, as a liquid supply pump 13, the amount [of variable flows] type flow rate pump constant [non-rippled] is suitable.

[0025] The interior of the coating-machine head 1 consists of a manifold 7 and a slit 2, and respectively highly precise finishing is given. The supplied application liquid is filled by the manifold 7, in the narrow clearance through which it passes when further sent to a slit 2, the influence of the dynamic pressure by liquid sending of a pump 13 is mitigated, the pressure distribution in the cross direction are equalized, and it flows out from a lip 3, and forms the perpendicular curtain layer 4.

[0026] The perpendicular curtain layer 4 with which the profile became uniform crosswise contacts the web 5 which is carrying out the continuity run, and is applied to a web 5. The edge guides 11a and 11b do not exceed the width of face of the coating-machine head 1 here, but the width of face of a web 5 is exceeded further, and it is prepared, and a perpendicular curtain layer exceeds the width of face of a web 5, and is formed. The perpendicular curtain layer 4 exceeds the width of face of a web 5, and it is formed for preventing thick coating of the coated layer in the both ends of the perpendicular curtain layer 4. The application liquid which exceeds the width of face of a web 5 and flows down is collected by the liquid receiver 10, and after returning to the application liquid storage tank 12, it is applied again. Moreover, application liquid is collected by the liquid receiver 10, when a web 5 cuts and an application is interrupted.

[0027] The airstream accompanied to a web 5 at the contact section (it is henceforth called the "application section".) of the web 5 and the perpendicular curtain layer 4 which are carrying out the continuity run is covered, and ***** 9 is formed in order to reach a web 5, without confusing the perpendicular curtain layer 4 by the time style of the air of the curtain circumference etc. Moreover, by changing the course with a roll 8 just before the application section, the conveyance orientation of a web 5 is constituted so that the influence of the application section on the air accompanied to a web 5 may be minimized.

[0028] Although the height from a web 5 to the outflow section of the coating-machine head 1 lower

part is needed to some extent in order to apply the perpendicular curtain layer 4 made to form in the status that it was stabilized, it is also possible to control the height in this embodiment, and the height suitable for the stability of the perpendicular curtain layer 4 is 120-180mm still preferably 100-250mm preferably 60-300mm.

[0029] this invention cannot be overemphasized by that various deformation is possible, without being limited to the above embodiment. Although width of face of the formed curtain layer was made into size from the width of face of a web 5 in the embodiment mentioned above This is for preventing the increase in the coverage in application layer both ends. When such an increase in a coverage is smallness or it seldom considers as a problem, Or when it can cancel by adopting the technique indicated by JP,49-14130,B etc., in addition the increase prevention technique in a coverage, a perpendicular curtain layer is made in agreement with the width of face of a web 5, or it does not interfere as smallness somewhat from this.

[0030] Moreover, it is also possible to attach a profile adjustment device or a controlling mechanism to a curtain head. When the adjustment device was attached for the opening profile to the slit 2 especially shown in drawing 1 and especially application width of face becomes large, a more uniform coverage profile can be obtained crosswise.

[0031] As shown in drawing 1 and the drawing 2 , the curtain coater said here makes liquid flow out of the narrow slit 2 of the coating-machine head 1, forms a curtain-like liquid membrane, and applies to the web 5 crosses it and it runs continuously. After the liquid with which drawing 2 flowed out of the slit 1 to liquid flowing down directly, and drawing 1 forming the curtain layer 4 from the slit 2 of the coating-machine head 1, and being applied to a web 5 forms a uniform liquid membrane in respect of [6] a slide, it forms the curtain layer 4 and is applied to a web 5. From finally both forming the curtain layer 4 which is a thin flowing-down liquid membrane similarly, it is a curtain coater fair and this invention includes these.

[0032] In this invention, the application liquid which makes a pigment a principal component is the liquid water was made to melt or distribute with a pigment, a binder, in addition an additive, and the concentration of a pigment, a binder, in addition an additive says 10 - 70% of the weight of a thing. As for the blending ratio of coal of a pigment and a binder, it is desirable that a binder is generally 10 - 70 weight section preferably more than 5 weight section to the pigment 100 weight section.

[0033] As a pigment for coated paper used by this invention, a kaolin, clay, a satin white, titanium oxide, an aluminum hydroxide, a zinc oxide, a barium sulfate, a calcium sulfate, a silica, the activated clay, a lake, a plastics pigment, etc. are mentioned.

[0034] As a binder used for this invention, a styrene butadiene system, Vinegar ** and acrylic, ethylene and a vinegar ** system, a butadiene methyl methacrylic system, Various copolymers, such as a vinegar ** butyl acrylate system, polyvinyl alcohol, Synthetic system adhesives, such as a maleic-anhydride copolymer, an isobutene and a maleic-anhydride copolymer, and an acrylic acid, a methyl methacrylate system copolymer, The adhesives generally known, such as natural system adhesives, such as an oxidized starch, a etherification starch, an esterification starch, a cold-water soluble starch that carries out flash plate dry cleaning of an enzyme denaturation starch or them, and is obtained, casein, and soybean protein, are mentioned. Moreover, the various assistants blended with the usual pigments for coated paper, such as a thickener, a water retention agent, a deck-watertight-luminaire-ized agent, and a coloring agent, can use it suitably if needed.

[0035] The application constituent of this invention obtained in this way is a monolayer or a thing by which a multilayer coating tip is carried out at both sides or one side of a web. Use of coaters other than a curtain coater is also possible to the application of the lower layer section in a multilayer application, and the wet-on-wet method of application which performs the upper application further, without drying the lower layer application section may be performed to it.

[0036] As a web used by this invention, the paper of fine quality generally used, a report grade paper, ****, a machine coat paper, an art paper, cast-coated paper, a synthetic paper, resin coated paper, a plastic film, etc. are included.

[0037] In this invention, the coverage of the application liquid which makes a pigment a principal component is dry weight canon, and 3-30g/m² is [two or more / 1g //m] / suitable for it preferably.

[0038]

[Function] By applying the pigment which contains the delamination clay which contains the grain of a particle diameter 1 micrometers or more for a curtain coater 80 to 100% of the weight more than 3 weight section in this invention to the application of application liquid made into a principal component, the application stabilized by prolonged operation can be performed, there is no application fault, an application layer is excellent in gloss, and is uniform, smooth nature is high, and the pigment coated paper for printing which printing unevenness does not generate is obtained.

[0039]

[Example] Next, although an example explains this invention still in detail, this invention is not limited to this. In addition, each the section and % which are shown below are weight criteria.

[0040] To the paper of fine quality of 160g of examples/, and the basis weight (bone dry) of m², by the curtain coater, the solid-content concentration of the following combination adjusted the under coat application liquid which is 48%, applied by 1200m in application speed, and min, and produced under coat stencil paper so that the coverage of a bone dry might be set to 8g/m².

[0041]

<Under coat liquid combination> - marketing whiting (car ***** 90) : The 70 sections The 2nd class clay of - marketing (***** light) : The 30 sections - marketing phosphorylation starch : The nine sections - styrene butadiene latex : The eight sections - marketing polyacrylic-acid system dispersant : The 0.1 sections - sodium hydroxide : The 0.1 sections [0042] The finishing application liquid whose solid-content concentration is 55% was adjusted by the following combination. Here, the used delamination clay carries out mixed processing of the commercial elegance, and it adjusts it so that the grain of a particle diameter 1 micrometers or more may serve as 84% of a particle size distribution. By the curtain coater, finishing application liquid was applied to the under coat stencil paper obtained before by 1200m in application speed, and min so that the coverage of a bone dry might become with 8g/m², and the pigment coated paper for printing was produced.

[0043]

<Finishing liquid combination> - marketing whiting (car ***** 90) : The 30 sections The 2nd class clay of - marketing (Amazon 88) : The 36.5 sections The 2nd class clay of - marketing (hide lath pass) : The 30 sections - marketing delamination clay (mixture) : The 3.5 sections - marketing polyacrylic-acid system dispersant The :0.1 section - marketing phosphorylation starch : The two sections - styrene butadiene latex : The 16 sections [0044] In example 2 example 1, the particle diameters of delamination clay differed and the thing with the particle size distribution which contains grain 1 micrometers or more 99% was used. Except it, it is the completely same technique as an example 1, and the pigment coated paper for printing was produced.

[0045] The additions of delamination clay differ, the addition of delamination clay is increased among the eight sections, and the increment is coped with [example / example 3 / 1] by reducing an addition among the 32 sections from the 36.5 sections in Amazon 88. Except it, it is the completely same technique as an example 1, and the pigment coated paper for printing was produced.

[0046] The additions of delamination clay differ, the addition of delamination clay is increased among the eight sections, and the increment is coped with [example / example 4 / 2] by reducing an addition among the 32 sections from the 36.5 sections in Amazon 88. Except it, it is the completely same technique as an example 2, and the pigment coated paper for printing was produced.

[0047] Except having carried out pigment combination of example 5 finishing as follows, it is the completely same technique as an example 1, and the pigment coated paper for printing was produced.
- Commercial whiting (car ***** 90) The :10 section The 2nd class clay of - marketing (Amazon 88) The :30 section The 2nd class clay of - marketing (hide lath pass) The :10 section - marketing delamination clay (mixture) The :50 section [0048] The additions of delamination clay differ, the addition of delamination clay is reduced among the 2.6 sections, and the decrement is coped with

[example / example of comparison 1 / 1] by increasing an addition among the 37.4 sections from the 36.5 sections in Amazon 88. Except it, it is the completely same technique as an example 1, and the pigment coated paper for printing was produced.

[0049] The additions of delamination clay differ, the addition of delamination clay is reduced among the 2.6 sections, and the decrement is coped with [example / example of comparison 2 / 2] by increasing an addition among the 37.4 sections from the 36.5 sections in Amazon 88. Except it, it is the completely same technique as an example 2, and the pigment coated paper for printing was produced.

[0050] In example of comparison 3 example 1, the particle diameters of delamination clay differed and the thing with the particle size distribution which contains grain 1 micrometers or more 74% was used. Except it, it is the completely same technique as an example 1, and the pigment coated paper for printing was produced.

[0051] In example of comparison 4 example 1, the particle diameters of delamination clay differed and the thing with the particle size distribution which contains grain 1 micrometers or more 45% was used. Except it, it is the completely same technique as an example 1, and the pigment coated paper for printing was produced.

[0052] The additions of delamination clay differ, the addition of delamination clay is increased among the eight sections, and the increment is coped with [example / 3 / of example of comparison 5 comparison] by reducing an addition among the 32 sections from the 36.5 sections in Amazon 88. Except it, it is the completely same technique as the example 3 of a comparison, and the pigment coated paper for printing was produced.

[0053] The additions of delamination clay differ, the addition of delamination clay is increased among the eight sections, and the increment is coped with [example / 4 / of example of comparison 6 comparison] by reducing an addition among the 32 sections from the 36.5 sections in Amazon 88. Except it, it is the completely same technique as the example 4 of a comparison, and the pigment coated paper for printing was produced.

[0054] The coater differed from example of comparison 7 example 3, and it applied instead of the curtain coater by using an air knife coater and setting an application speed to 400m/min. Except it, it is the completely same technique as an example 3, and the pigment coated paper for printing was produced.

[0055] The coater differed from example of comparison 8 example 3, and it applied by using a blade coater instead of the curtain coater. Except it, it is the completely same technique as an example 3, and the pigment coated paper for printing was produced.

[0056] The coater differed from example of comparison 9 example 3, and it applied instead of the curtain coater by using a gate roll coater and setting an application speed to 600m/min. Except it, it is the completely same technique as an example 3, and the pigment coated paper for printing was produced.

[0057] The applied sample evaluated, after performing calender processing.

[0058] The glossiness of the sample after calender processing was measured as incident angle [of 75 degrees]-angle of reflection of 75 degrees using the evaluation technique 1 blank-paper gloss Murakami formula glossmeter.

[0059] 2) After having used the printing gloss RI-II type printing testing machine and printing the ink (Oriental king ultra 12 red) of a constant rate in a sample, the Murakami formula glossmeter was considered as 60 degrees of 60 degrees-reflex of incidence, and glossiness was measured.

[0060] 3) Smoothness smoothness was measured with the ***** star smoothness testing machine (**** electronic industry incorporated company make, formal SM-6A).

[0061] 4) The printing unevenness sample was wetted in the Roland offset press, water printed it on the conditions of the excess of water supply, and proper conditions, it was left at the room temperature one whole day and night, and printing unevenness was evaluated by viewing about the printing section whose rate of area of the half tone dot of the monochrome of the cyanogen of a

sample is 50%. An evaluation unit shall be most excellent in five phase evaluation, and 5 wets it in it, and water judges what printing unevenness does not generate at all over the front face of a sample on oversupply conditions to be 5, it wets, and water is the conditions of oversupply. By judging what generates the feeble printing unevenness with a small area to be 4, and wetting it, when the printing unevenness with a comparatively big area has occurred on condition that oversupply, water The case where judge the case where judge with 3, wet and feeble printing unevenness has occurred on the conditions with proper supply of water to be 2, wetted it, supply of water expired on proper conditions, and kana printing unevenness had occurred was judged to be 1.

[0062] 5) The fault detection equipment installed in the coater performed the detection of an application fault application fault, and the length of a fault to an application length estimated.

Application faults detectable [with fault detection equipment] are the overapplication sections with non-applied fractions, such as a streak and a scratch, such as a fault and dirt, and a detection is detectable if width of face is a thing 0.3mm or more. In consideration of a margin in case the length of a fault deletes the fault section, as for the length of a fault, the length with a fault actual as a length which added 1m before and after the fault is set to 2.1m by even the 0.1m case.

[0063] An evaluation result shows an example in Table 1, and shows the example of a comparison in Table 2. Blank paper gloss, printing gloss, and smooth nature are high by applying by the curtain coater, and printing unevenness does not generate the application liquid which made the principal component the pigment containing the 3 or more sections of the delamination clay with which a particle diameter contains grain 1 micrometers or more 80 to 100% of the weight, either, but the pigment coated paper for printing which occurrence of an application fault does not have, either can be obtained so that clearly from an example and the example of a comparison.

[0064]

[Table 1]

	塗布装置	デラミネーション 部	≥1μm %	白紙 光沢 %	印刷 光沢 %	平滑 度 mmHg	印刷 むら	塗布 欠点 (%)
実施例 1	カーテン	3. 5	8 4	6 5	6 9	1 0	4	0
2	カーテン	3. 5	9 9	6 7	7 0	9	4	0
3	カーテン	8. 0	8 4	6 7	7 0	9	5	0
4	カーテン	8. 0	9 9	6 8	7 2	9	5	0
5	カーテン	5 0. 0	8 4	7 1	7 5	9	5	0

[0065]

[Table 2]

	塗布装置	デラミネーション 部	$\geq 1\mu\text{m}$ %	白紙 光沢 %	印刷 光沢 %	平滑 度 mmHg	印刷 むら	塗布 欠点 (%)
比較例 1	カーテン	2. 6	9 9	6 3	6 4	1 2	4	0
2	カーテン	2. 6	8 4	6 3	6 4	1 4	3	0
3	カーテン	3. 5	7 4	6 4	6 5	1 4	3	0
4	カーテン	3. 5	4 5	6 3	6 3	1 3	3	0
5	カーテン	8. 0	7 4	6 4	6 4	1 2	4	0
6	カーテン	8. 0	4 5	6 3	6 4	1 2	3	0
7	エアナイフ	8. 0	8 4	6 4	6 2	1 7	2	1. 6
8	ブレード	8. 0	8 4	6 4	6 5	1 0	4	3. 2
9	ゲートロール	8. 0	8 4	6 1	6 0	1 9	1	3. 4

[0065]

[Effect of the Invention] If according to this invention application liquid contains the delamination clay with which a particle diameter contains grain 1 micrometers or more 80 to 100% of the weight more than 3 weight section and performs an application of this application liquid using a curtain coater, there is no occurrence of an application fault and printing unevenness, and gloss and the pigment coated paper for printing excellent in smooth nature can be obtained.

[Translation done.]

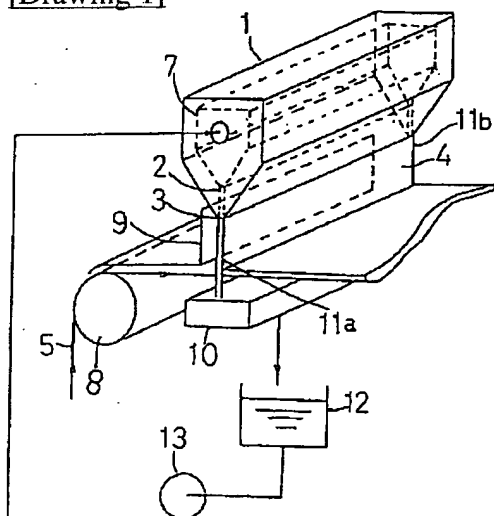
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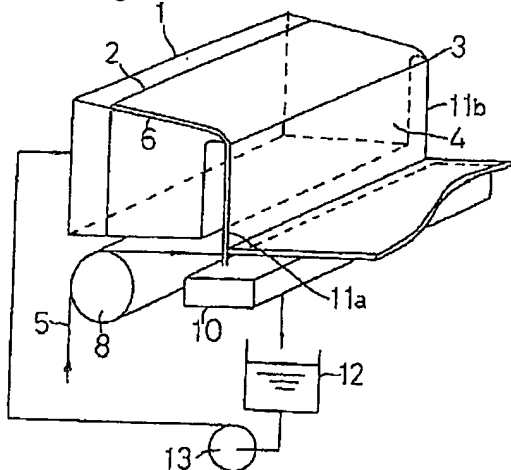
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DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]